clear. This picture of increased peristaltic activity with early emptying is frequently noted in gastric carcinoma without obstruction.

The demonstration of a pressure tender point definitely located over the duodenum has in my experience been unconvincing. Such pressure tender points, when present, probably indicate local peritoneal inflammation.

The lagging of the opaque material in the duodenum to such a degree that the greater portion is outlined, although occasionally seen in duodenal ulcer, occurs also in various other conditions. It therefore lacks any diagnostic significance.

*Organic.*—Chronic duodenal ulcers with scar contraction may present the following radiologic evidence:

1. Probable normal stomach.
2. Improbable spasm of the greater curvature.
3. Possible hypertonic stomach.
4. Possible dilated stomach.
5. Probable increased peristaltic activity.
6. Probable six-hour residue.
7. Possible pressure tender point over duodenum.
8. Probable distortions or irregularities of duodenal cap.
9. Possible residue in duodenal cap.

The first three findings have already been considered.

Dilatation of the stomach occurs as a result of obstruction and retention as in gastric ulcer with obstruction. In duodenal ulcer, the pyloric portion of the stomach is usually more to the right side than in gastric ulcer with obstruction. Increased peristaltic activity is apt to be present either with the hypertonic stomach or with the dilated stomach.

The six-hour residue is the result of duodenal obstruction from scar contraction and may be of an extreme grade.

The indurated ulcer area produces more or less distortion and irregularity of the duodenum radiologically evident in the outline or position of the doudenal cap. The demonstration of such permanent irregularity or distortion is sometimes readily accomplished, but often requires the use of special methods, frequently repeated examination, radiographs with the patient in different positions, direct filling of the duodenum, etc. The presence of a constant defect in the doudenal cap evidences the presence of some definite morbid process, which may, however, be secondary to gall-bladder disease and various other conditions as well as to chronic duodenal ulcer. With chronic penetrating or chronic perforating duodenal ulcer, we may find the opaque material beyond the normal duodenal shadow as in similar ulcers of the stomach. Duodenal diverticulitis will give a picture closely simulating a penetrating ulcer of the duodenum.

A six-hour residue in the duodenal cap or a residue in the duodenum after complete emptying of the stomach indicates duodenal obstruction. This usually follows chronic duodenal ulcers but may be associated with gall-bladder disease, duodenal diverticulitis, new growths, etc.

In settling upon a plan of treatment, the radiologic evidence is of the utmost value. The one absolute indication for surgical intervention is the presence of obstruction with retention. The question of operative procedures in cases showing no retention is open for discussion but does not fall within the scope of this paper.

In conclusion, I may state that the radiologic examination of the gastro-intestinal tract, when properly carried out and properly interpreted, furnishes information unobtainable by other procedures and that when considered with the findings by the other methods of examination is a most valuable aid in the diagnosis of gastric and duodenal ulcers.

## MEDICAL MANAGEMENT OF DUODENAL ULCER.*

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Notwithstanding the inspiring revelations which come to us from the physiological laboratories, from the darkrooms of our radiologists and from the surgical clinics, is the interpretation of an ulcer's conduct often a very baffling thing. Long ago have I learned to correct, amplify, change or reverse my diagnosis, while managing its treatment; and of equal importance with the findings at the outset of our observation must we look upon the manifold therapeutic reactions as they emerge during a so-called ulcer-management. It should be intimately interwoven with differential diagnostic considerations. Where we have time allowance of from six weeks to six months to restore our patients to health and happiness, or to deliver them into the hands of the surgeon, should that span of time be devoted to constant observations of detail. We may have to shift our plan of treatment as we learn the characteristics of our cases. We must be prepared by the very success of our method of treatment to prove that our patient was not suffering of the ailment we were treating him for, having learned in the meanwhile that this is the one thing he is not afflicted with. It may be well to accentuate the changeable nature of our therapeutics in the face of the common impression that duodenal or pyloric ulcer treatment is a routine treatment par excellence, to be grouped under two or three headings, say bed-rest cure with initial starvation, following sliding feeding with increasing doses of milk, with or without additional cream, type Von Leube cure, or similar initial bed rest with rapidly increasing feeding of milk, eggs and meat, type Lenhartz; or ambulatory cure all together, with large amounts of cream and olive oil. But how are we going to determine which method is to succeed or where and when it will fail? This can only become manifest as we are taking care of the case. By rationally applying the underlying principles of these different methods at the appropriate moment, will we be more liable to get through with the case successfully than by adhering strictly to one method until the sweet or bitter end.

One of the first decisions to be made is whether we shall put our patient to bed or not, this depending upon people and circumstances; some of our patients cannot take to the bed, and older

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people, I find, do better by being allowed to move about in their own accustomed fashion. Imperatively do call for rest in bed, cases of bleeding, whether manifest or occult; frequent vomiting, pressure pain in the right upper quadrant, declared emaciation, pregnancy, active menstruation, diarrhea, fever and scant urine, with numerous hyaline casts and very ptotic individuals.

A bleeding case will do best by complete bed rest, complete functional rest of stomach, by either an opium and belladonna suppository, or morphine-atropine hypodermic, to be repeated as needed. It is rather rare to have a patient bleed fatally and our decision whether or not to operate has to be made with more good luck than wisdom. By all means does it seem questionable what good adrenalin with its secondary vaso-dilatation, ergot, with its bloodpressure raising effect; bismuth or iron chloride with its foreign body irritative effect will do. Normal horse serum is being used as in hemophylia; but will it materially help in forming a large thrombus? Stockton used it in powdered form, called it coagulose. But it seems that absolute rest, typical opium rest, with an ice bag suspended over the motionless patient is the best we can do. And in earlier days in severe bleeding was venesection and tying of arms and legs to spare the peripheral blood resorted to.

More modern would be transfusions; or infusion of defibrinated blood of an acceptable group; and opening of the abdomen in search of the bleeding spot under local anesthesia or nitrous oxide and oxygen. A case, with hemoglobin below 20, which I saw in consultation with Dr. Millspaugh was so treated, and quickly and brilliantly restored to health.

In bleeding of minor degree would rectal drip with solution of calcium chloride seem appropriate. Gelatin I have never used and where hyperacidity is not too conspicuous a feature will rectal alimentation for a few days allow a complete pyloric rest. Profuse hemorrhage seems to reduce considerably the Hcl secretion—and many a case gets well fast after a severe bleeding. An objectionable feature of rectal feeding is the stimulation of Hcl secretion,—and of gastric motility as well. But those cases which show scant urine, emaciation, some degree of acetonuria through previous vomiting and starvation will be benefited by rectal intake at intervals or by continuous drip of hypotonic solutions.

Where bleeding is not a feature, and still our patient is in bed, will constant hot poulticing as Von Leube recommended, or intermittent steaming for two hours at a time two or three times a day contribute to the relaxation of the pylorus, also reducing the congestion of the inflamed organ. The hot poultice furthermore should be used as a tool by an observant nurse. Whenever in the course of a day some heaviness or fullness is complained of, slight nausea or pain not relieved even by alkali, does it look as if retention is the cause, and a hot poultice applied at that instant will bring relief. An observant nurse, who by some inexplicable predilection has decided to really manage for us such cases can do very much to further the success of our cure. An occasional hiccough, a little belching, some uneasiness of the patient will prompt her to look at the abdomen and note visible distension, to elicit a slight slush, and she will lengthen the interval of feeding, reduce the quantity of nourishment, or even stop all feeding for that day.

Precision, pedantic precision is necessary but not so much of dosage as of observation of indications. Some of our patients, time-long sufferers, have learned their lesson, and they are our best assistants, if we discuss their case with them methodically, and analyse their daily symptoms.

In the night will a Priessnitz bandage for those who go to sleep in it do great good. Night rest is of the greatest importance as a nerve restorer and because it indicates absence of harm done to the ulcer during that period. What is the harm? The disturbance of its rest, necessary to its healing. It seems obvious that the main damage is done by corrosive action of free Hcl. and the other by spastic contraction of the pylorus and disturbances of the ulcerbase. Both clinical and radiographic observations show that in duodenal ulcer hypermotility, increased peristalsis is the rule —which, however, does not run parallel with hyperacidity: neither does this mean, that total clearing of the stomach does take place in shorter time.

The opposite may be true, even without any stenosis by cicatrix, band or kink, even with a fully patulous pylorus will the process of evacuation gradually come to a standstill, with the result of a residue of increasing acid titre at two, three and four hours after meals. This being the time when the patient suffers pain, or when he in the middle of his sleep wakens with pyrosis. This is the time for following measures, hot applications; administration of magnesia, or soda, or both; the hypodermic of atropine, and, if need be, the introduction of the stomach tube. And this moment, this event has to be watched at its approach and be properly met. Who will do it? The attentive nurse or the observant patient. How little benefit do we derive from initial examination as to stomach motility and secretion, as disturbances of these functions will arise under varying conditions. One of the problems in ulcer management is the treatment of hyperchlorhydria and the consideration of all its causes. We all know, that a sufferer of duodenal ulcer, pure and simple, will often suffer greatly in the night, at 1, 2, 3 or 4 a. m., when he is alone with his misery, and nothing but pain and worry for companion. The next night perhaps after a pleasant evening of diversion will be passed in restoring sleep. Some morninig hour of 10-11, especially when annoying business has been anticipated, will be torture; next day, after an identical breakfast, no trouble at all. A woman, in bed with her ulcer cure, approaches her menstruation; and for a day or two all our measures have to be altered. What does it indicate?

That nervous influences profoundly alter the secretion, from day to day, from one meal to another. And in as much the ulcer healing de-

mands protection against the corrosive action of free Hcl, does it become part of our treatment to follow these variations by our single methods of correction. Any one has observed how patients will be able to digest fat at some time better than at other times; again, that some patients tolerate fats at all times, and others are invariably distressed by them. Now one leitmotive of ulcer management is liberal introduction of cream, unsalted butter, olive oil, almond oil, the rationale being that these fats decrease Hcl. secretion, and greatly increase the caloric value of our food. So then, have the cream on ice, have the oil in the house and use it, as indicated; and stop as soon as evident distress is the result. Still will one repeatedly read publications describing such methods of treatment, that untoward effects usually disappear after a few days of persistent continuation. Now this is wrong, once at the treatment should there be no distress or discomfort; because every time does it mean fresh injury to the ulcer, which is the same as a setback of so many hours or days. The relief, if not seen to by attendant, will be brought about in two ways: nausea and vomiting, or abdominal distress, bloating, diarrhea accompanied by headaches and biliousness. But this means an error in management and it calls for reduction in fat constituents; in reduction of quantity or lengthening of interval, in administration of magnesia. Magnesia has other advantages over soda, it binds more chlorine, it does not liberate carbon dioxide, which distends the stomach, and it does not form sodium chloride, which is reabsorbed, but magnesium-chloride, which leaves the body in the feces. One of the principles of ulcer management is the reduction of chlorine constituents, so that in hyperchlorhydria, from whatever cause, salt or salted food should be withdrawn or greatly diminished. The best and most effective way of removing the corroding Hcl, especially towards night during the first week or so of the treatment, when acidity still runs high, is the use of the stomach tube. There is no harm whatever connected with its introduction if properly performed in the case under discussion: duodenal or pyloric ulcer.

It is different with small curvature ulcer. In the clinic practice of Sippy, this most inspiring and brilliant teacher, is it made a rule in ulcer or hyperchlorhydria management, to stop feeding at about 4 p. m. the tube then passes at about seven for the double purpose of removing the acid gastric contents and determining its titre and degree of retention and again, on indication of slight distress or on presence of slushing, another aspiration is done at about ten. The stomach is now left at rest for all the night. The relief is complete and soon permanent. In the management of such cases of retention which for some reason or another do not reach the surgeon, do I teach my patients to use the tube at night before going to bed. I would feel inclined to divide all ulcer treatment into two periods: the treatment during function of digestion, the treatment during the period of rest, which is the night, and in some cases lasts from 24 to 72 hours at the onset of our cure. During digestion is it a matter of food selection as to acid binding quality (casein and albumin) as to acid depressing quality (cream, oils) as to quantity dependent upon degree of spasticity amount of inflammatory swelling: as to interval. During functional rest the night and early morning have the ideal time for local application. Large doses of bismuth subcarbonate or of milk of bismuth may be given in the night—either after lavage or at bedtime, the last feeding taking place at about five or six being small in bulk. With it may be given one or more ounces of olive oil—or even (when olive oil is not so well tolerated, and still the laxative lubricating effect on the bowels is desired liquid paraffine) again is the morning hour, anywhere from 4 a. m. on, the time for the administration of Karlsbad sprudel salts in warm water.

At the outset of any ulcer cure it is well to administer calomel or blue mass or podophyllin followed by a saline; and during the further management is a rigid attention to state of liver and bowel of the utmost importance. Of late years have I become somewhat prejudiced against the use of large amounts of flesh flood in the hyperchlorhydria concomitant with ulcer. But a freer use of well cooked rice or other cereals has proven of greater assistance.

There are methods of more recent perfection, which in the hands of some have given excellent results. Especially do I mean Einhorn's duodenal feeding; only lately have I started their use, so cannot express any opinion. While East did I see some very good results, but also many complete failures, even in the hands of competent men.

I am well aware that in these fifteen minutes I cannot do justice to the vast material by which one is surrounded, who sees many cases of this type. I could have spoken of the atrophine treatment to which I am very partial: of the use of orthoform and anesthesin; of the use of silver nitrate, either in form of lavage 1 to 5000 twice a week or in solution on Boas recommendation, before meals, which drug has to be handled with great care and discrimination; of the use of peroxide of hydrogen, which for the time being reduces hypercholorhydria. Nor was there time to mention the management of arterio-sclerosis, which Ophüls has shown to be so often at the bottom of ulcer.

But I have chosen to express my conviction that there is no one special method of treating ulcer of the duodenum, even not a method of methods, as Dr. Weinstein formulates, but that it should be our aim to cover the raw spot, to reduce the inflammation, to relax the spasticity, to diminish the hyperchlorhydria, to improve the general health. I should have spoken of exercise, of better living, wholesome living, of abandoning coffee, alcohol and tobacco and of the cheerful attitude which is justifiable in the face of the promise on honest basis of observation, that ulcer of the duodenum if not complicated and caused by other surgical lesions and if not complicated by adhesions or stenosis, is curable, medically, dietetically, hygienically in a large percentage of cases.